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EXAMINER

JONES, JUDSON

ART UNIT PAPER NUMBER

2834

DATE MAILED: 12/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/890,934

Applicant(s)

TANAKA, KEIICHI

Examiner

Judson H. Jones

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-66 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 9-16, 18, 21-23, 30, 31, 33-40, 42-48, 50, 53-55, 62, 63, 65 and 66 is/are rejected.
- 7) ☒ Claim(s) 8, 17, 19, 20, 24-29, 32, 41, 49, 51, 52, 56-61 and 64 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6, 9-15, 18, 33-39, 42-47, 65 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eisaku (Japanese reference 10206104 A, cited by Applicant) in view of Takei 5,565,718, Sawyer 3,376,578 and Chitayat 5,334,892. Eisaku discloses a planar motor having an iron plate with a grid as shown in figure 20, a controller that detects position information of the mover based on information concerning an inductance of the coil as shown in figures 18 and 19 with the inductance being detected by differential detectors 22, 23, 26, 27, supplied to an interpolation circuit 30, then to A/D converters 32, 34 and then to ROM35 and on to processor circuit 36 as described in paragraph 0048. Eisaku does not disclose the stator having a coil or the mover having a magnetic flux generator. Paragraph 0003 of Eisaku describes figure 20 and states "the yoke of one fixed side is constituted by the board of pure iron ..." However Chitayat discusses a prior art device (Sawyer 3,376,578) which has a yoke of pure iron with a grid as described in Sawyer column 3 lines 31-45. Chitayat states in column 2 lines 6-25 that the Sawyer motor and similar devices have numerous limitations, and proposes instead a mover having a magnetic flux generator as described in column 6 lines 46-54. Since Chitayat and Eisaku are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized a magnetic flux generator

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having permanent magnets in place of the pure iron yoke of Eisaku in order to improve motor performance by smoothing motor motion and improving rotational motion. In regard to the stator having a coil, Takei teaches in column 10 lines 11-16 that a linear motor can be a moving magnet type or a moving coil type. Moving coils are typically lighter than moving magnets but need special electrical connections to maintain contact between the power supply and the moving coils. Since Takei and Eisaku as modified by Chitayat are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized a movable magnet type embodiment in order to simplify the electrical connections to the coils and thus reduce the complexity and cost of the motor.

In regard to claims 2, 19, 34, 43 and 46, see Eisaku figures 18 and 21 where inductance is measured across the plurality of coils L1, L2, L3, L4.

In regard to claims 3, 18, 35 and 40, see Sawyer column 4 lines 7-9 where using a magnetic material as a coil support to provide a return flux path is taught. Since Sawyer and Eisaku as modified by Takei and Chitayat are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized a magnetic material as a coil support for a planar motor in order to improve the performance of the motor by providing a return flux path and thereby reducing the amount of stray flux.

In regard to claims 4 and 37, see the abstract of Eisaku which states, "The position of a moving body due to the movement of the moving element on the two-dimensional platen is detected."

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In regard to claims 5, 10 and 38, see Eisaku paragraph 0048 which discusses the operation of processor 36.

In regard to claims 6, 39 and 47, see Eisaku figure 20.

In regard to claims 9 and 12, see Eisaku figure 11, elements 12 and 13.

In regard to claim 11, see Eisaku figures 15 and 18.

In regard to claims 13 and 14, see Eisaku paragraph 0003 which discusses using the planar motor for precision positioning of semiconductor processing equipment. See also Chitayat figure 2 where element 12 is viewed by the examiner as being a stage.

In regard to claim 15, see Chitayat figure 7a.

In regard to claims 36 and 44, see Eisaku figures 18 and 21 where inductance is measured across each of the plurality of coils L1, L2, L3, L4.

In regard to claims 45, 65 and 66, see Chitayat figure 2 where element 12 is viewed by the examiner as being a stage.

Claims 7, 16, 40, 48 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eisaku in view of Takei, Chitayat 5,334,892 and Chitayat 4,985,651. Eisaku as modified by Takei and Chitayat '892 discloses the planar motor having a magnetic flux generator but does not disclose a magnet supporting member made of a magnetic material. As shown in figure 7b, there is a magnet supporting member 68 but Chitayat '892 refers to it as a base in column 10 lines 25-28 with no mention of the material for the base. However Chitayat '651 teaches using a magnet supporting member made of a magnetic material in column 7 lines 1-8. Since Chitayat '651 and Eisaku as modified by Takei and Chitayat '892 are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary

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skill in the art to have utilized a magnet supporting material made of magnetic material in order to provide a return flux path and thus improve the efficiency of the machine by preventing excessive stray flux loss.

In regard to claim 48, see Chitayat '651 column 11 lines 22-26 which teaches a stage made from aluminum, which is a non-magnetic material. Since Chitayat '651 and Eisaku as modified by Takei and Chitayat '892 are both from the same field of endeavor, it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized aluminum to make the stage in order to reduce the weight of the stage.

Claims 21-23, 30, 31, 53-55, 62 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eisaku in view of Takei, Chitayat '892 and Tsutsui 4,924,258. Eisaku as modified by Takei and Chitayat '892 discloses the planar motor and stage device but does not disclose the stage device used in an exposure apparatus having an illumination system. However Tsutsui teaches that stage devices are used with exposure devices in column 2 lines 58-68.

In regard to claims 22, 23, 30, 31 and 55, see Tsutsui column 1 lines 18-28.

In regard to claims 53 and 54, see Chitayat figure 2 where element 12 is viewed by the examiner as being a stage.

In regard to claims 62 and 63, see Tsutsui column 1 lines 46-49.

Allowable Subject Matter

Claims 8, 17, 19, 20, 24-29, 32, 41, 49, 51, 52, 56-61 and 64 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record does not disclose or teach a plurality of magnets for the flux generator of a planar motor magnetized in a direction not perpendicular to the movement plane as recited in claims 8, 17, 41 and 49. The prior art of record does not disclose or teach combining a position detection unit in addition to an inductance measurement unit as recited in claims 19 and 51.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Woolsey 5,488,566 discloses an inductive position sensor utilizing multiple sensor coils as described in column 2 line 61 to column 3 line 14. Hollis, Jr. et al. 6,175,169 B1 discusses prior art position detection systems for planar motors in column 1 line 19 to column 5 line 45 and discloses his own position detection system in his specification and claims. Chitayat 4,985,651 discloses in figure 2 magnets that are not magnetized perpendicular to the direction of motion in a linear motor. This teaching would not necessarily apply to planar motor magnets.

Any inquiry concerning this communication should be directed to Judson H Jones whose telephone number is 703-308-0115. The examiner can normally be reached on 8-4:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on 703-308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3431 for regular communications and 703-305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

JHJ
December 2, 2002

Judson Jones
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